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09/724,803	11/28/2000	Gregory G. Cappiello	34013-28PT	7805

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EXAMINER

AMARI, ALESSANDRO V

ART UNIT

PAPER NUMBER

2872

DATE MAILED: 07/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/724,803

Applicant(s)

CAPPIELLO ET AL.

Examiner

Alessandro V. Amari

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-145 is/are pending in the application.
- 4a) Of the above claim(s) 1-34, 40-45, 65-100, 106-111 and 132-145 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 35-39, 46-64, 101-105 and 112-131 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

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DETAILED ACTION

Double Patenting

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 35-39, 46-50, 51-55, 56-60, and 61-64 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 37-41, 48-52, 53-57, 58-62 and 63-67 of U.S. Patent No. 6,577,786 Cappiello et al in view of Derickson et al U.S. Patent 5,796,479.

Cappiello et al teaches the instant diffraction grating claimed but does not teach its use in an optical signal monitoring apparatus. Derickson et al does teach the use of a diffraction grating in a signal monitoring apparatus (a detector array spectrometer). It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the instant diffraction grating claimed in the application in a detector array spectrometer in order to achieve high resolution and spectral coverage.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 35, 46, 50, 51 and 55 are rejected under 35 U.S.C. 102(b) as being anticipated by Mowry, Jr. et al. U.S. Patent 5,403,040.

In regard to claim 35, Mowry, Jr. et al. discloses a diffraction grating, comprising: a reflective material having a blazed surface with a blaze angle between about 27 degrees and about 39 degrees; and an optically transmissive material disposed adjacent the reflective material and having an index of refraction (n), wherein the blazed surface of the reflective material has approximately $(500 \pm 110) * n$ number of grooves per millimeter as described in column 5, lines 43-48.

In regard to claim 46, Mowry, Jr. et al. discloses a diffraction grating, comprising: a reflective material having a blazed surface with a blaze angle between about 37 degrees and about 40 degrees and an optically transmissive material disposed adjacent the reflective material having an index of refraction (n), wherein the blazed surface of the reflective material has approximately $(200 \pm 40) * n$ number of grooves per millimeter as described in column 5, lines 43-48.

Regarding claim 50, Mowry, Jr. et al. discloses a substantially planar substrate on which the reflective material is formed as shown in Figures 1 and 2.

In regard to claim 51, Mowry, Jr. et al. discloses a diffraction grating, comprising: a reflective material having a blazed surface with a blaze angle between about 41 degrees and about 44 degrees; and an optically transmissive material disposed adjacent the reflective material having an index of refraction (n), wherein the blazed surface of the reflective material has approximately $(450 \pm 40) * n$ number of grooves per millimeter as described in column 5, lines 43-48.

Regarding claim 55, Mowry, Jr. et al. discloses a substantially planar substrate on which the reflective material is formed as shown in Figures 1 and 2.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 35, 37, 46, 51, 56-58, 60-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laude U.S. Patent 5, 080,465.

In regard to claim 35, Laude teaches (see Figure 13) a diffraction grating, comprising: a reflective material (726) having a blazed surface with a blaze angle between about 27 degrees and about 39 degrees as described in column 4, lines 65-68; and an optically transmissive material (air), disposed adjacent the reflective material and having an index of refraction (n) ($n_{\text{air}} = 1.0$), wherein the blazed surface of the reflective material has approximately $(500 \pm 110) * n$ number of grooves per millimeter and column 5, lines 4-5. Regarding claim 37, Laude teaches that the diffraction order

associated with the lowest loss is the first order as described in column 5, lines 8-10. In regard to claims 46, 51, 56 and 61, Laude teaches (see Figure 13) the diffraction grating comprising a reflective material (726) having a blazed surface and an optically transmissive material (air), disposed adjacent the reflective material and having an index of refraction (n) ($n_{\text{air}} = 1.0$). Regarding claim 60, Laude teaches a substantially planar substrate on which the reflective material is formed as shown in Figure 13.

However, in regard to claims 35, 37, 46, 51, 56, 57, 58, 61, 62 and 63, Laude does not teach that the blazed surface has a blaze angle between 37 and 40 degrees and that the blazed surface of the reflective material has approximately $(200 \pm 40) * n$ number of grooves per millimeter or that the blazed surface has a blaze angle between 41 and 44 degrees and that the blazed surface of the reflective material has approximately $(450 \pm 40) * n$ number of grooves per millimeter or that the blazed surface has a blaze angle between 68 and 76 degrees and that the blazed surface of the reflective material has approximately $(200 \pm 20) * n$ number of grooves per millimeter or that the blazed surface has a blaze angle between 50 and 56 degrees and that the blazed surface of the reflective material has approximately $(250 \pm 30) * n$ number of grooves per millimeter or that the number of grooves per millimeter is between about 180 and about 220 or that the diffraction order associated with the lowest loss is the fifth order or that the number of grooves per millimeter for the reflective material is between about 220 and about 280; or (in regard to claim 63) that the diffraction order associated with the lowest loss is the fourth order.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to arrive at the blaze angles and groove frequencies and diffraction orders with the lowest losses claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to vary the blaze angles and groove frequencies for the purpose of achieving different diffraction efficiencies. (*In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235)

7. Claims 59 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laude U.S. Patent 5, 080,465 in view of Official Notice.

Regarding claims 59 and 64, Laude teaches the invention as set forth above but does not teach that the reflective material is at least one of the following: gold material, aluminum material and silver material. Official Notice is taken that it is notoriously old and well known in the grating art to utilize reflective material from one of the following: gold material, aluminum material and silver material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use gold, aluminum or silver because of the high reflectivity that these materials provide.

8. Claims 36, 38, 39, 47, 48, 50, 52, 53 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laude U.S. Patent 5, 080,465 in view of Knop U.S. Patent 4,426,130.

Regarding claims 36, 38, 39, 47, 48, 52 and 53, Laude teaches the invention as set forth above and regarding claims 50 and 55, Laude teaches a substantially planar substrate on which the reflective material is formed as shown in Figure 13.

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However, Laude does not teach in regard to claim 36 that the number of grooves per millimeter for the reflective material is between about 710 and about 790 or in regard to claim 38, that the number of grooves per millimeter is between about 850 and 950 and that the blaze angle is between 31 and 34 degrees or in regard to claim 39, that the number of grooves is between 950 and 1050 and that the blaze angle is between about 34 and 39 degrees; or in regard to claim 47, that the number of grooves per millimeter is between 260 and 340 or in regard to claim 48 that the diffraction order associated with the lowest loss is the fourth order or in regard to claim 52, that the number of grooves per millimeter is between 560-640 or in regard to claim 53 that the diffraction order associated with the lowest loss is the second order or that the index of refraction of the optically transmissive material is between about 1.44 and about 1.64.

Knop does teach that the index of refraction of the optically transmissive material is between about 1.44 and 1.64 as described in column 6, lines 23-62.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optically transmissive material having an index of refraction between about 1.44 and 1.64 in order to protect the grating. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrive at the blaze angles and groove frequencies and diffraction orders with the lowest losses claimed, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. One would have been motivated to vary the blaze

angles and groove frequencies for the purpose of achieving different diffraction efficiencies. (*In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235)

9. Claims 49, 54, 59 and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laude U.S. Patent 5, 080,465 in view of Official Notice.

Regarding claims 49, 54, 59 and 64, Laude teaches the invention as set forth above but does not teach that the reflective material is at least one of the following: gold material, aluminum material and silver material. Official Notice is taken that it is notoriously old and well known in the grating art to utilize reflective material from one of the following: gold material, aluminum material and silver material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use gold, aluminum or silver because of the high reflectivity that these materials provide.

10. Claims 101, 103, 112, 117, 122, 123, 125-128, 130 and 131 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamel et al. U.S. Patent 5,748,815 in view of Laude U.S. Patent 5,080,465.

In regard to 101, 103, 112, 117, 122, 125-128, 130 and 131, Hamel et al. does teach (see Figure 5) a wavelength division device, comprising a plurality of first coupling components (72, 74, 76, 78), each first component being capable of receiving a distinct carrier for carrying a signal; a second coupling component (68) disposed adjacent the first coupling components and capable of receiving a distinct carrier for carrying one or more signals; and a diffraction grating (70) optically coupled to each carrier received by the first and second coupling components and a diffraction grating optically coupled to

each carrier received by the first and second coupling components as shown in Figure 5.

However, Hamel does not teach the diffraction grating having the specific blaze angles and groove densities claimed above.

In regard to claims 101, 103, 112, 117, 122, 123, 125, 126, 127, 128 and 131, Laude teaches a diffraction grating having the specific blaze angles and groove density discussed above. Regarding claim 130, Laude teaches a substantially planar substrate on which the reflective material is formed as shown in Figure 13.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the grating of Laude in the device of Hamel in order to improve the multiplexer performance.

11. Claims 114, 119, 124 and 129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamel et al. U.S. Patent 5,748,815 in view of Laude U.S. Patent 5,080,465 and further in view of Official Notice.

Regarding claims 114, 119, 124 and 129, Hamel et al in view of Laude teaches the invention as set forth above but does not teach that the reflective material is at least one of the following: gold material, aluminum material and silver material. Official Notice is taken that it is notoriously old and well known in the grating art to utilize reflective material from one of the following: gold material, aluminum material and silver material. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use gold, aluminum or silver because of the high reflectivity that these materials provide.

12. Claims 102, 104, 105, 113, 115, 116, 118, 120, and 121 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamel et al. U.S. Patent 5,748,815 in view of Laude U.S. Patent 5,080,465 and further in view of Knop U.S. Patent 4,426,130.

In regard to claims 102, 104, 105, 113, 115, 116, 118, 120 and 121, Hamel et al in view of Laude teach the invention as set forth above and a diffraction grating having the specific blaze angles and groove densities discussed above.

However, Hamel et al in view of Laude does not teach that the index of refraction of the optically transmissive material is between 1.44 and about 1.64.

In regard to claims 102, 104, 105, 113, 115, 116, 118, 120 and 121, Knop does teach that the index of refraction of the optically transmissive material is between about 1.44 and 1.64 as described in column 6, lines 23-62.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the optically transmissive material having an index of refraction between about 1.44 and 1.64 in the combination of Hamel et al in view of Laude in order to protect the grating and in order to improve the multiplexer performance.

Response to Arguments

13. Applicants arguments filed 06 May 2003 have been fully considered but they are not persuasive.

The Applicants argue that the prior art, Mowry does not show any specific set of parameters of the diffraction grating but only states that the number of grooves per millimeter can vary from 3-3600 and the blaze angles can vary from 0 to 45 degrees.

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The Applicants further argue that while Mowry has a cover material over a grating surface, there is no mention as to the value of the index of refraction of the cover material and thus there will be no showing that the Mowry diffraction grating meets the grooves per millimeter requirements found in claims 35 $((500 \pm 110) \cdot n)$, claim 46 $(200 \pm 40) \cdot n$ and claim 51 $((450 \pm 40) \cdot n)$.

In response to this argument, the Applicant is reminded that the claim rejection is based upon the claim recitation. In column 5, lines 43-48; Mowry specifically describes a diffraction grating that meets the claimed blaze angle ranges of 27-39 degrees (claim 35), 37-40 degrees (claim 46), and 41-44 degrees (claim 51). Furthermore, Mowry meets the claimed number of grooves per millimeter of $(500 \pm 110) \cdot n$ (claim 35), $(200 \pm 40) \cdot n$ (claim 46), $(450 \pm 40) \cdot n$ (claim 51) which are all in the ranges claimed as described in column 5, lines 46-47 of Mowry. Furthermore, it should be noted that Mowry meets the claimed limitation that the number of grooves per millimeter be multiplied by the index of refraction of the optically transmissive material since inherently, the optically transmissive material described in Mowry (i.e., plastic) must have an index of refraction which would typically be between 1.0 ~1.7 which when multiplied by any of the claimed ranges would fall within the upper limit of 3600 grooves per millimeter described by Mowry thus meeting the claim limitation.

The Applicants further argue in regard to the rejection over Laude that the claimed diffraction gratings provide critical and unexpected results with Figures 2-7 showing the results for different diffraction gratings claimed. Comparisons of efficiencies of the diffraction grating for the claimed wavelength range of the instant

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invention to the Laude grating show a substantial increase in efficiency which are new and unexpected.

In response to this argument, the Examiner would point out that grating efficiency is a function of wavelength and groove spacing. The efficiency curve also depends on the angle of use (i.e., blaze angle). This relationship is illustrated on pages 36-37 of Loewen and Popov, which shows that grating efficiency is a function of these parameters. Therefore, the applicants have not shown why someone of ordinary skill in the art would not expect the result of increased grating efficiency by varying these parameters nor the criticality of these parameters.

The Applicants further argue that there is no showing or suggestion in Laude for a diffraction grating having the claimed grating parameters wherein Laude fails to show efficiency measurements in the C-band wavelength range but rather shows that the grating is adapted for a different range of wavelengths or channels.

In response to this argument, the Examiner would like to point out the rejection is based upon the claim recitation. Laude does meet the claimed limitations as described in column 4, lines 65-68 and column 5, lines 1-7 wherein a grating is specified as having a blaze angle of 26.75 degrees (i.e., "about 27 degrees" as recited in line 3 of claim 35) and with a grating spacing of 420 grooves per millimeter (i.e., "(500 +/-110) *n" as recited in line 7 of claim 35). The optically transmissive material can be air ($n=1.0$ as in Laude) or another material as applied in the Laude in view of Knop rejection. As for the other groove spacing and blaze angle ranges recited, since the general conditions of the claim are disclosed in the prior art, discovering the optimum ranges by varying

groove spacing and blaze angles involves only routine skill in the art as explained above. Furthermore, in regard to the use of the Laude grating in a particular wavelength range, the Examiner would point out that none of the claim recitations specify a wavelength range of use.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alessandro V. Amari whose telephone number is (703) 306-0533. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on (703) 305-0024. The fax phone numbers for


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the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

ava *ava*
July 10, 2003


MARK A. ROBINSON
PRIMARY EXAMINER